## New data on the stratigraphy of Cenozoic sediments located on the left flange of the Arkala River Gorge (Georgia)

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Detailed structural-lithological and paleontological researche was carried out on the left flange of the river Arkala, right tributary of the Aragvi River, along its tributaries Bantsurtkhevi and Brachultkhevi, Vladikavkaz-Tbilisi gas pipeline and Arkala river channel, using nannoplankton, within the framework of detailed geological study of the Southern Slope of the Greater Caucasus Mestia-Tianeti and Gagra-Java zones. The obtained results have shown that in the sediments of the Gagra-Java zone confined to the Upper Eocene according to lithofacies and the rather poor planktonic foraminifers, according to nannoplankton 5 complexes of different levels of Miocene-Lower Pliocene age were distinguished for the first time. They are: the zones *Triquetrorhabdulus carinatus* (CN1a,b, NN1), *Helicosphaera ampliaperta* (CN3; NN4), *Sphenolithus heteromorphus* (CN4; NN5), subzone *Amaurolithus primus* (CN9b) of a zone *Discoaster quinqueramus* (CN9; NN11) and a subzone *Ceratolithus acutus* (CN10b) of a zone *Amaurolithus tricorniculatus* (CN10; NN12). And within the limits of flyschoid sediment of the Southern Slope of Mestia-Tianeti zone, also for the first time, is distinguished a *Ceratolithus acutus* (CN10b) subzone of the Upper Miocene-Lower Pliocene zone *Amaurolithus tricorniculatus* (CN10; NN12). In this part of the section also are established Paleocene zones - *Cyclococcolithus robustus* (NP4), *Fasciculithus tympaniformis* (NP5), *Discoaster mohleri* (NP7), *Discoaster multiradiatus* (NP9) and Upper-Cretaceous - *Micula murus, Lithraphidites quadratus* (Maastrichtian) zones.

## Interference folding of the Southern Slope of the Greater Caucasus

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As a result of the detailed geological-structural researches within the various segments of the Southern Slope of the Greater Caucasus, the development of interference folding has been established. It occurred due to the transformation of the primary linear folded structures of north-eastern strike, formed at the Early- Middle Alpine and Early Orogenic stages during the north-eastern compression of the Greater Caucasus. At the Late Orogenic collision stage the orientation of the previous horizontal thrust in this region was replaced by the submeridional stress. It caused the northward movement of certain block-schols of the Black Sea-Transcaucasian micro-continent and its intrusion into the folded system of the Greater Caucasus. Such deformation caused the superposition (inclined at an angle of 45°) of submeridional strains and the repeated compression of the structures on the local areas of development of the previous folding of north-western strike. Due to these diverse tectonic processes within the marginal zone of the Greater Caucasus there was formed a typical interference folding.

# Climate change in mountains of Southwest Bulgaria during modern times

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The currently observed climate change primarily affects sensitive ecosystems and ecological boundaries. High mountain regions and their hypsometric zoning are exceedingly struck by changes. The Balkan Peninsula is situated in the climatic transition between the temperate zone and Mediterranean conditions. It is characterised by a mosaic of mountains, basins and valleys. In the course of global climatic changes it can be assumed that the region will become dryer and warmer. To evaluate the current situation the few existing climate proxy data sets need to be amended by precisely dated and highly time resolved geoarchives that allow a survey of the last centuries.

A secured reconstruction of climate and landscape development requires geoarchives with a high temporal solution. In this study we compared *Pinus heldreichii* from ecologically different sites located close to each other in the Bulgarian Pirin Mountains. This tree is a conifer, growing up to 1,000 years. Generally, this species only occurs on the Balkan Peninsula and in the southern part of Italy. The spectrum of parameters comprises tree ring width (total, early and late wood), wood density (minimum and mean early wood density, mean and maximum late wood density) as well as stable isotopes ($\delta^{13}C$, $\delta^{18}O$). The different parameter chronologies were correlated with time series of various climate quantities from local stations as well as CRU 2.1 grid point data. The objective was to find relevant relationships and test their stability over time. We will discuss the significance of each tree ring parameter with respect to climate reconstruction at different frequencies.

*Pinus heldreichii* demonstrate a mixed climate signal, influenced by both high summer temperatures and periods with low precipitation. Mild winters have a positive growth effect. So it is possible to obtain precise data for the past periods with both, extremely dry or cold years. The series of tree ring width correlate with individual climate parameters and indicate colder climate conditions at the timber line ecotone between the 15$^{th}$ and mid-19$^{th}$ century. Afterwards, the growth of conifers increased again. Several events are archived in more than 700 years old series such as the Maunder Minimum of sun spots activity in 1672-1704 and volcanic eruptions.

Tree rings of *Pinus heldreichii* at extreme sites have proven to be reliable and valuable archives for climate signals, especially for regions where data records are short in time or fragmentary. Furthermore, due to the recent climate change *Pinus heldreichii* could be a "winner" at the treeline. We established a monitoring of *Pinus heldreichii* and climate parameters at the timberline (ring width, air and soil temperature and moisture).

The cyclic up-and-down of historic climate conditions and the increasing human impact can be detected in pollen profiles of peats, glacier features and soils (stratigraphy, macrofossils, charcoal, $^{14}C$-dating) for the region too. Site specific effects as well as the impact of historical disturbances have been analysed at treeline ecotone testplots. As the temperature and the altitude of treeline have not been subject to significant changes during the past millennia, recent tendencies of climate warming are likely to modify treeline ecotones with consequences for soils, biodiversity and natural resources.

## The effect of future ozone recovery on the vitamin D effective dose rates

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The future estimation of the total ozone column densities and vertical profiles of ozone and temperature, as derived from Chemistry Climate Models (CCMs), are used in a spectral radiative transfer model to quantify the effect on the vitamin D effective dose rates.

Based on preselected scenarios, changes in greenhouse gases, surface halogens, sea surface temperature and sea ice concentration were included in the CCM simulations. Monthly mean results on different grids over the globe for total ozone, temperature and ozone vertical profiles up to the lower mesosphere for the 1980-2080 time period were provided for this study.

For each CCM, radiative transfer calculations for cloud-free skies and constant values of aerosol optical properties and surface reflectivity were performed. For the vitamin D effective dose rates, the percentage differences over the polar regions, relatively to the estimations for the 1995-2005 decade, is up to 50% during the 2070s, depending on the season. Similarly, differences up to 5 and 30% are revealed over the tropics and the mid-latitudes respectively. Although the research into the prediction of UV radiation levels is ongoing, due to the possible future changes in cloudiness, aerosols or surface reflectivity, the long-term changes in ozone, as projected by the CCMs in a similar way, will affect strongly the vitamin D doe rates in the future.

## Human records of geological/environmental events

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Establishing links between geological/environmental trends and/or catastrophic events and human records remains an important issue to better assess and understand some interactions between the many parameters which affect our evolution during at least the last 20,000 years.

In this presentation we first briefly review what are the implications and direct impacts on man's historic records of short-term natural phenomenon such as earthquakes, volcanic eruptions, tsunamis, floods and others catastrophic events.

We then try to evaluate what are the main effects on mankind of progressive geological/environmental trends such as sea levels fluctuations, glaciations, which also directly interrelate with some periods of human history.

- *Short time scale (days and years)*

Weather variability (including anomalies such as hurricanes, storms, floods and droughts) may induce almost instantaneous but strong *local* effects upon man and its environment. Earthquakes, volcanism, tsunamis, landslides belong also to this category of events which, although relatively local in space and short in duration, may induce severe problems to human settlements, habitats, or health and may be stored as histories, legend and myths.

- *Middle time scale (one to a few centuries)*

Variations in sun activities may induce significant *regional* effects (a few tenths of degrees C in temperature) upon the Earth's climate. Until recently, those processes were mainly recorded in Europe but nowadays data from both hemispheres point to the role of solar energy variations. The early Middle-Age Optimum, when Vikings raised cattle along Greenland coasts or when wine grew in Britain, the Little Ice Age, responsible for the $16^{th}/17^{th}$ centuries' cold spells and bad crops are good examples of these mid-scale climatic events which have direct impacts on socio-economical and political structures. A number of historians have suggested that the European revolutions in the 18th century were partly induced by the severe life conditions due to such mid-scale cooling.

- *Longer time scale (millennia)*

It is now well established that the Milankovich orbital changes induce major environmental *global* changes. The ocean surface temperatures, recorded in oceanic and ice cores, may vary by about 7°C between glacial and interglacial peaks. Sea level changes of several meters to tens of meters, extension or reduction of permafrost areas, islands, or tropical deserts, interconnections between emerged continental areas, delta progradation, all these relate to this time scale of events. Mankind is clearly very sensitive to such changes, especially those related to sea level (at times quite rapid although rarely catastrophic), permafrost (or ice) cover and deserts. Around the Mediterranean Sea, the societal and political impacts of such worldwide climatic changes have been considerable, in particular during the Holocene. Throughout the Old World, the Neolithic revolution was associated with global warming and the onset of more favorable humid conditions after the precessional maximum around 11,000 BP. In contrast the arid period starting around 4,000 BP is associated with the collapse of several civilizations (Mesopotamia, Anatolia, Egypt, Indus…) through droughts, invasions and subsequent political changes.

## Re-appraisal of Bath's law for earthquake sequences globally distributed

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The distribution of the magnitudes difference $D_1$ between the main shock (M) and the largest aftershock ($M_1$) for large aftershock sequences globally distributed is observed to be peaked at 1.2 magnitude units, according to Bath's law. The main shock of these sequences is greater than or equal to 7.0, and their focal depths restricted to shallow earthquakes. The difference $D_1$ is also evaluated for the east and west sides of the Pacific rim, as well as in the Eurasia continent. These values found to be peaked in values around the average global value. Statistical tests made in order to check if these differences are statistically valid. The obtained result revealed that this difference mainly depends on the degree of the material's heterogeneity of the examined areas.

# Late Miocene events of the Black Sea region: comparative study of diatoms and nannofossils from sites 380, 381 DSDP Leg 42B and Zheleznyi Rog section, Taman Peninsula

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During the last few years, the results of deep-sea drilling in the Black Sea (DSDP Leg 42B) received a new interpretation. These deposits are used as evidence for Messinian events at Eastern Paratethyan.

The Miocene-Quaternary deposits, penetrated by holes 279, 380 and 381 on the Bosphorus slope of the Black Sea basin, mostly contain brakish and sweet water microfossils, which makes biostratigraphic dating of these sediments a difficult task. A lithostratigraphic correlation of the sediments of all three holes was proposed in previous studies, based on analysis of sediment lithology and chemistry and using biotic data as paleoecologic indicator. On these grounds, similar succession of the most ancient lithostratigraphic units from holes 380 and 381 was established. In these studies, black shales (unit V Hole 380A), laminite marls and shales (unitI Ve ), pebbly mudstones - breccia (Unit IVd Hole 380A and Unit 6, Hole 381) were considered as Tortonian and Messinian deposits. Laminate mud (Unit IVc and Unit 5, Hole 381), lacustric shales (Unit IVb and Unit 4, Hole 381)), sideritic mud (Unit IVa Hole 380A and Unit 3 Hole 381) were correlated to Zanclian.

It has been proposed that breccia have been formed during the Messinian sub-aerial exposure of the Black Sea floor. Based on seismic data, the existence of the Messinian erosional surface was established at the top of Unit 6 (Hole 381) and Unit IVd (Hole 380A).

We have studied diatoms and nannoplankton from Unit IVe - IVa Hole 380A and unit 3 Hole 381. At the base Unit IVe we have established Upper Maeotian - Lower Pontian assemblages of microplankton. In the upper part of Unit IVe, diatoms show increasing abundance of benthic brackish water species. The nannoplankton assemblage is impoverished; planctonic diatom species are lacking. Breccia deposits (unit IVd) have abundant Braarudosphaera nannoflora at the base and laminated stromatolite at the top of the Unit. At overlying deposits (Unit IVc, Hole 380A Unit 5, Hole 381) we identified Upper Meotian - Lower Pontian as the microplankton assemblages similar to “Transitional formation” of Zheleznyi Rog section. The diatoms includes *Thalassiosira convexa* and *Th. praeconvexa* - marker- species of pre-evaporite Messinian at Mediterranean region.

We consider Units IVe-IVc of Hole 380A coeval to “Transitional formation”. It is known that the beginning of Messinian was marked by a short term transgression, rapidly acquiring pulsing character, stipulated by periodical closing of the connection with Atlantic. Same discontinuous pulsing rhythm of deposits is typical for “Transitional formation” of Zheleznyi Rog section and Unit IVe-IVc of Hole 380A. So we consider breccia Unit IVd as slop slumping deposits intra “Transitional formation”.

This connection with Atlantic was short-term and was replaced by accumulation of lacustric sediments – Unit IVb – that lithologically and ecologicaly correspond to the Upper Pontian and by sideritic or pyritic mud (Unit IVa) that is easily correlated with the Kimmerian.

# Application of a cassette reagent generator in a rocket assisted cloud seeding methodology

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The quality of a hail suppression system is heavily dependent upon the efficient seeding of a hail producing cloud. Cloud seeding process is accomplished through a number of steps. The initial step requires the use of meteorological radar to measure the region or volume of the cloud that will be seeded. The second step involves the seeding of the given volume by injecting the reagent. The principles of a reagent injection into the target cloud volume by using rockets are described in the following section. Depending on the applied diffusion model it is possible to calculate the amount of reagent and the rocket trajectory, both necessary to establish a uniform concentration of particles in a given period of time [T] (this time period should be as short as possible). A rocket is an example of a continual moving source capable of dissipating reagent in a dotted pattern, with the maximum concentration of particles at the trajectory peak point. The number of particles rapidly decreases after the peak. One of the main challenges for the rocket technology developers around the world was to achieve a uniform dissipation of the reagent into the cloud region as far from as possible from the basic trajectory.

This presentation describes the successful realization of a cassette reagent generator rocket as part of a joint development venture between RHMZ Serbia and rocket manufacturer "Poliester" a.d. Priboj. The result of this venture is a single component rocket with central activation. Ignition is activated by electric impulse when launching a rocket from launching device. Once activated, the rocket engine launches the rocket in the given flight direction.

Each rocket is equipped with a transceiver and time-setter device whose purpose is to activate the cassette generator. The cassette generator then performs a "line and cassette" dispersion of the reagent. Linear dispersion of the reagent takes place first, starting 10 seconds after the launch, with the duration of 20 seconds. The amount of reagent dispersed during this phase equals 120g. In the second phase of the flight that occurs between the $13^{th}$ and $16^{th}$ second after the rocket launch, the first cassette opens up. From $20^{th}$ to $24^{th}$ second the second cassette is open and finally from $26^{th}$ to $31^{st}$ second the contents of the third cassette are released. Each cassette contains 12 molded units with each molded unit weight of 10g. Molded units are released from the cassette with the velocity of 15 m/s. The cassette is opened by the pressure of gases produced by discharge filling burnout. Molded units are symmetrically placed on the rocket axis so all forces mutually cancel each other. This helps to minimize the effect that release of the cassette could have on flight of the rocket. Each molded unit has a burn-out time of 10 seconds. Given methodology allows for a volume based distribution of 480g of reagent carried by the rocket to the target region. The result is increased reagent diffusion in given time period T.

Since the overall efficiency of the cloud seeding is increased while still using the same amount of reagent, this methodology is proven to be very beneficial for the economy of a hail suppression company.

## Ivy (*Hedera helix* L.) impact on historic stone surfaces: agent of bioprotection or biodeterioration?

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The role of ivy (*Hedera helix* L.) on historic building surfaces is much debated, with arguments being put forward for it playing a biodeteriorative role (*e.g.* through ivy rootlets exploiting cracks and holes) as well as suggestions that it may provide some bioprotection (*e.g.* the ivy canopy protecting the walls from agents of deterioration such as frost). We carried out a year-long investigation to assess the impact of ivy canopies on both microclimates and particulate deposition on stone surfaces in England.

Results at five sites throughout England showed the average daily maximum temperature was 36% higher and the average daily minimum temperature 15% lower on exposed vs ivy-covered surfaces. Differences in the exposure level of studied walls (i.e. whether they are shaded or not by trees or other walls) influenced the degree of microclimatic alteration provided by the ivy canopy. Other important factors influencing the strength of the ivy impact on microclimate were found to be thickness of the canopy and aspect of the wall. The observed moderating role of ivy canopies on wall surface microclimates will reduce the likelihood of frost and salt deterioration to the building materials, thus contributing to their conservation.

Scanning Electron Microscope analysis of external and internal samples from leaf samples at sites in Oxford, England identified that ivy (*Hedera helix* L.) leaves act as an effective 'particle sink', absorbing airborne dust with particulate number, diameter and density rates varying both between and within sites. Peak deposition rates and percentage of particles <2.5 µm were along a busy vehicle corridor. The difference between particulate counts on the outer canopy exposed to high traffic was several times greater than on covered ivy at the wall surface, suggesting that ivy can reduce stone exposure to pollutants that can instigate decay processes. However, there was little dust impact on the non-urban site.

Assessment of ivy's interaction with the built environment should acknowledge how ivy moderates wall microclimates and can reduce the effect of aerosol particulates on stone surfaces. Results suggest a potential bioprotective role for ivy on historic stone walls; further research can clarify possible deteriorative impacts.

## Application of terrestrial laser scanning (t-LiDAR) to characterize the morphology and morphotectonics of bedrock fault scarps in Greece

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We present the first results of terrestrial laser scanning (t-LiDAR) of a case study on different bedrock fault scarps in mainland Greece. The t-LiDAR system ILRIS-3D from Optech Inc. (Ontario. CA) has been applied for data acquisition. The advantages of the scanning method are the long range laser beam, the flexibility handling in the environment,

the very high spatial resolution of the object with information about x-, y-, z-coordinates, intensity of the backscattered signal in 256 grey values and the combination with a digital camera allows the combining of point cloud data with panchromatic information. The t-LiDAR permits also scanning of inaccessible scarp surfaces. Consequently, the processed t-LiDAR dataset (alignment of different scan windows, data filtering, cleaning and interpolation) allows to generating very high-resolution elevation models (HRDEM).

We scanned several bedrock scarps with known historical earthquakes and associated surface rupturing events in Delphi, Kaparelli, Loutraki and Sparta (Greece). All fault scarps are hard rock scarps formed within Mesozoic limestones and all have a natural free face. The Kaparelli scarp and the Sparta scarps have been dated previously by cosmogenic nuclids ($^{36}$Cl) as post-glacial maximum (< 20 ka), several palaeo-earthquakes on these scarps have been deduced by different exposure ages. However, the free faces are partly overgrown by lichen or plants, or show weathering and erosion, i.e. karstification. The distance between the scarps and the terrestrial laser scanner was in all cases under 50 m, so that the minimum point step was of 1 mm and the point accuracy was below 7 mm. This setup allows the acquisition of fault surface features (e.g. lineations, asperities, groves, Riedel shears, honey comb fractures), the dip angle and dip direction of the fault plane as well as slip direction, and the scarp degradation including the karstic features (rills and karren, solution pits) in a virtually 3D-format.

The digital processed elevation models of the scarp surfaces have been investigated from different view angles within the entire resolution range. That allows a quantitative analysis of any area of interest at any scale ranging from mesoscale-scarp morphology to mm-scale features as striation or rillen karst, indicating palaeo-reliefs and palaeo-surfaces. Furthermore, the fault geomorphology can be measured spatially. It is also possible to generate topographic profiles from the foot-wall to the hanging wall or colluvial wedge in order to estimate the cumulative slip.

The reason or the advantage for morphotectonic studies with the t-LiDAR method is the spatial calculation of the distribution of earthquake rupture features and calculation of the scarp height and slip variation of an fault escarpment or individual segments. Hence, the quantitative comparison of the scarps of surface rupturing fault is possible. To conclude this method can be a helpful by the reconstruction of the neotectonic/palaeoseismic history of faults in earthquake-prone areas with prominent post-glacial scarp such as the Mediterranean region.

## Extensional magma propagation, magmatic interactions with pre-existing boundary faults and implications for post-collisional crust-forming process in a small Turkic-type orogen: Lake Van region, Eastern Anatolia Accretionary Complex (E-Turkey)

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The Eastern Anatolia Accretionary Complex (EAAC), one of the major mountain ranges on Earth, constitutes a unique Geosciences laboratory hosting natural phenomena and processes on virtually all geosciences and sub-disciplines. There are several cross-cutting themes of tremendous scientific interest and practical relevance, such as the subduction-accretion, slab delamination, and crustal consolidation. These interactions over different timescales provide several critical implications for post-collisional crust-forming processes in Turkic-type orogens. Due to delamination and break off events and doming asthenosphere,

EAAC characterizes the most prominent example of hot and small Turkic-type orogens. This Turkic-type orogeny involves tectonic, magmatic and geodynamic processes that generate intense intraplate deformation and strike-slip faulting, active intraplate alkaline magmatism, thin-skinned tectonism, associated orographic sedimentation and shallow-seated seismicity. Due to its origin related to an active convergent-plate margin that causes thrust imbrication of terrane blocks, weak and irresistant suture complexes bounding major tectonic blocks, this orogeny shows extreme complexity, with strong gradients in tectonic and magmatic structure during post-collisional period.

Lake Van region, the deepest basin of the rotated portions of EAAC, is an Oligo-Miocene aged, thrust-bounded compressional ramp basin. Compared to other convergent lakes in major mountain ranges, such as Lake Baikal, Lake Van is not well studied and its geophysical characteristics poorly documented and understood. An overall understanding of this lake as a complex system is still lacking. This lack assumes utmost importance given the fact that Lake Van and surrounding highlands are prone to thinning convergent crust, decompressional magmatism and related events such as post-collisional opening of suture zones, through which extensional magma propagates. Seismic reflection modeling of these events requires a comprehensive understanding of the entire orogenic system. W-E trending elongation of the lake seems to have been a critical boundary zone, separating Bitlis Pötürge Massive (BP-M) in S from EAAC in N. This boundary zone is Muş suture complex, crossing S-marginal section of the lake, along which considerable complications of tectonic and magmatic peculiarities are observed from multi-channel seismic reflection data. Seismic data well evidence very clear structural expressions of strike-/oblique-slip deformation and extensional magmatism, suggesting extensional and transtensional tectonic evolution of this intermontane lake basin. Seismic data show that the NE-SW and W-E trending transtensional faults bordering SSW-flank of the lake and N-S trending smaller en echelon faults in SE-delta are the loci of off-axial volcano-magmatic eruptions. This indicates that W- and S-margins of the lake have been the sites of massive outpourings of basalt. These marginal sections are presumed to be extensions of subaerial fissure/fault-controlled plateau basalts located on the flake margins of the lake at upper crustal levels. Quaternary volcanic dome-cone centers and newly intruded magmatic occurrences are aligned along the major extensional zones, which comprise the lake. Nemrut volcanic center-Krikor dome at W and many of the extensional faults on the SSW-margin of the lake are also the loci of high magnetic anomalies. One particular feature, Incekaya peripheral collapsed parasitic cone is marked by a distinct magnetic anomaly (250 nT) surrounded by the low anomalies (-150 to -250 nT) in the central Tatvan Basin. This cone is located on the same set of faults and intrusions, which extend into central Tatvan basin. We propose that further injection has probably occurred along secondary faults, which have trapped upwelling magma at their points of intersection with the primary faults.

Seismic structural interpretation shows that extension and transtension have been taking place along a broad zone of magmatic intrusions, suggesting that magma can erupt rapidly to the surface along margin boundary faults if they cut deeply enough through the crust. In this manner, pre-existing thrust faults may completely or partially trap the propagating magmatism, implying extensional magma propagation through flake margins of the lake at upper crustal depths. Therefore, we postulate that multiple zones of magmatic intrusions might be a common phenomena along newly inverted basin margins of the lake. Multiple zones of magma entrapment might occur within any number of pre-existing faults associated with compressional ramp basin formation of the lake. Thus, the net effect on the lake bottom would be the appearance of multiple parallel zones of intrusions showing a broad-diffuse plate and/or suture boundary. This entrapment model is further complicated by changing stress fields and/or kinematic boundary conditions due to the reorientation of the basin boundary faults, such as backthrusting in N-margin boundary. It is argued that magmatic intrusions into the lake bottom have been initiated by the tectono-thermal response of underlying accretionary wedge complex to decompressional melting magmatism and hence, to doming hot asthenospheric front along basal detachment surface of the highly fractured upper crustal flake. This concludes that kinematics of marginal conditions is

changed, the pre-existing boundary faults are reactivated as strike-/oblique-slip faults, and the lake experiences a basin inversion, followed by extensional magmatism. Indeed, tectonic and magmatic evolution of Lake Van basin from seismic data evidences reveals post-collisional volcanic and magmatic implications for crustal consolidation and crust-forming processes in small Turkic-type orogens in the world.

## Perama project: Review of an environmentally compatible gold project in N. Greece

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Perama Hill project is an Au-Ag surface deposit located in the Maronia volcanosedimentary basin, 25km NW from Alexandroupolis (Thrace, NE Greece). It is owned by the Canadian Eldorado Gold Corporation (www.eldoradogold.com), an international gold producer mining company, through its Greek subsidiary Thracean Gold Mining SA (www.tgm.gr). Perama Hill deposit is initially a high-sulfidation epithermal system, of Late Eocene-Early Oligocene age, overprinted by low sulfidation banded quartz-chalcedony-barite veins and stockworks during Late Oligocene-Miocene times. It is a structurally controlled system trending NW-SE and the oxide mineralization is hosted in 80% porous sandstone and in 20% underlying andesites. It was discovered after extensive geochemical investigation of the area, following up a BLEG stream sediment anomaly of 9ppb and a local grid soil geochemistry. A 18,210 m drilling of the deposit resulted in a current oxide P+P (proven and probable) resources of 966,000 oz gold @ 3.2 g/t Au and 4.2 g/t Ag, with low strip ratio 0.3:1 (waste:ore). The metallurgical recovery is estimated more than 90%. Below the oxide mineralization there is a sulphide one open to depth. Perama Hill is an environmentally friendly project that has been designed according to the principle of “zero discharge to the environment”. Some of the project highlights are the small footprint (130 hectars) of the open pit mining operation, strict compatibility to EU Directives and BATs as well as to International and Greek standards, dry stack tailings deposition, optimal water management, strong finance position and gold mining experience from the project operating company. Currently the project is under permitting as the Preliminary Environmental Impact Study (PEIS) has been submitted and the EIS is being prepared. Construction is anticipated to begin in late 2011 with 8 years of operation to follow.